

# **Future Challenges in Managing Human Health and Performance Risks for Space Flight**

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The global economy forces many nations to consider their national investments and make difficult decisions regarding their investment in future exploration. To enable safe, reliable, and productive human space exploration, we must pool global resources to understand and mitigate human health & performance risks prior to embarking on human exploration of deep space destinations. Consensus on the largest risks to humans during exploration is required to develop an integrated approach to mitigating risks. International collaboration in human space flight research will focus research on characterizing the effects of spaceflight on humans and the development of countermeasures or systems. Sharing existing data internationally will facilitate high quality research and sufficient power to make sound recommendations. Efficient utilization of ISS and unique ground-based analog facilities allows greater progress. Finally, a means to share results of human research in time to influence decisions for follow-on research, system design, new countermeasures and medical practices should be developed. Although formidable barriers to overcome, International working groups are working to define the risks, establish international research opportunities, share data among partners, share flight hardware and unique analog facilities, and establish forums for timely exchange of results. Representatives from the ISS partnership research and medical communities developed a list of the top ten human health & performance risks and their impact on exploration missions. They also drafted a multilateral data sharing plan to establish guidelines and principles for sharing human spaceflight data. Other working groups are also developing methods to promote international research solicitations. Collaborative use of analog facilities and shared development of space flight research and medical hardware continues. Establishing a forum for exchange of results between researchers, aerospace physicians and program managers takes careful consideration of researcher concerns and decision maker needs. Active participation by researchers in the development of this forum is essential, and the benefit can be tremendous. The ability to rapidly respond to research results without compromising publication rights and intellectual property will facilitate timely reduction in human health and performance risks in support of international exploration missions.